



Water/Energy Nexus Activities of the CPUC

*UC Davis Energy Efficiency Center
Board of Advisors Meeting*



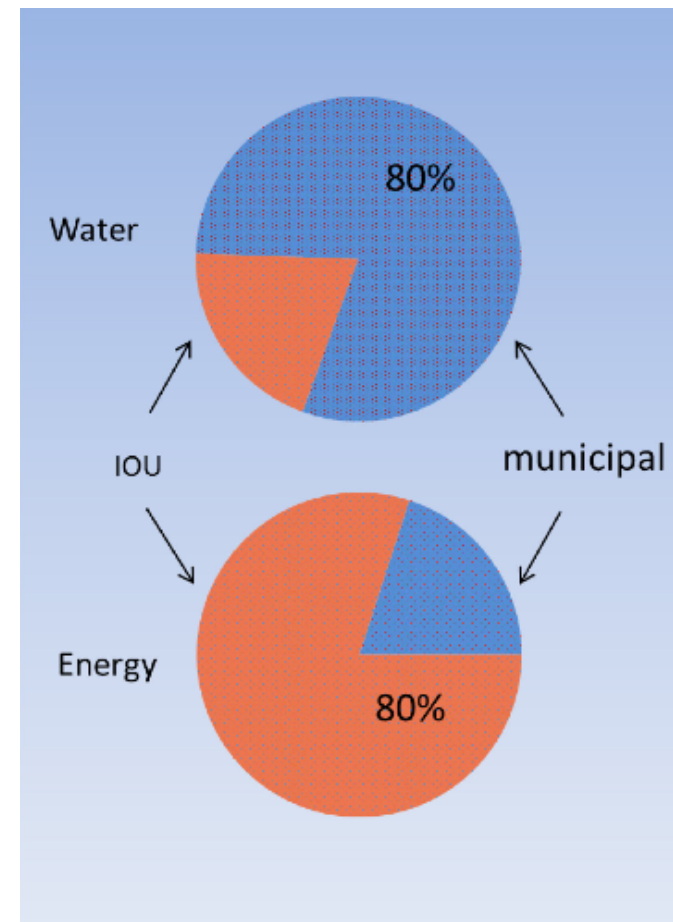
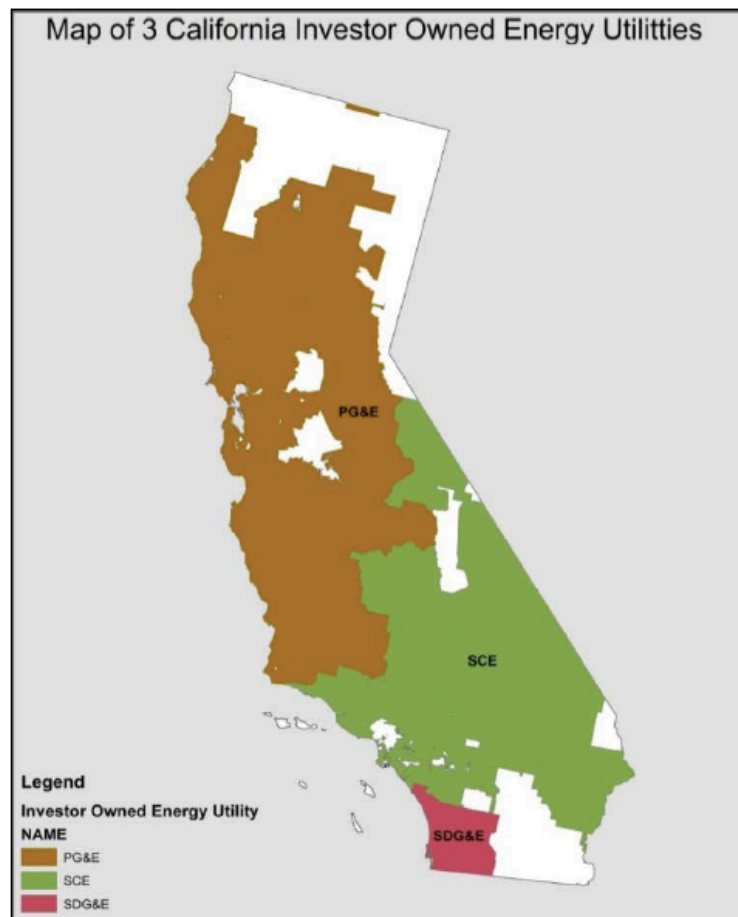
Mark Ferron
California Public Utilities Commission
November 6, 2013



CPUC's Role in Water and Energy

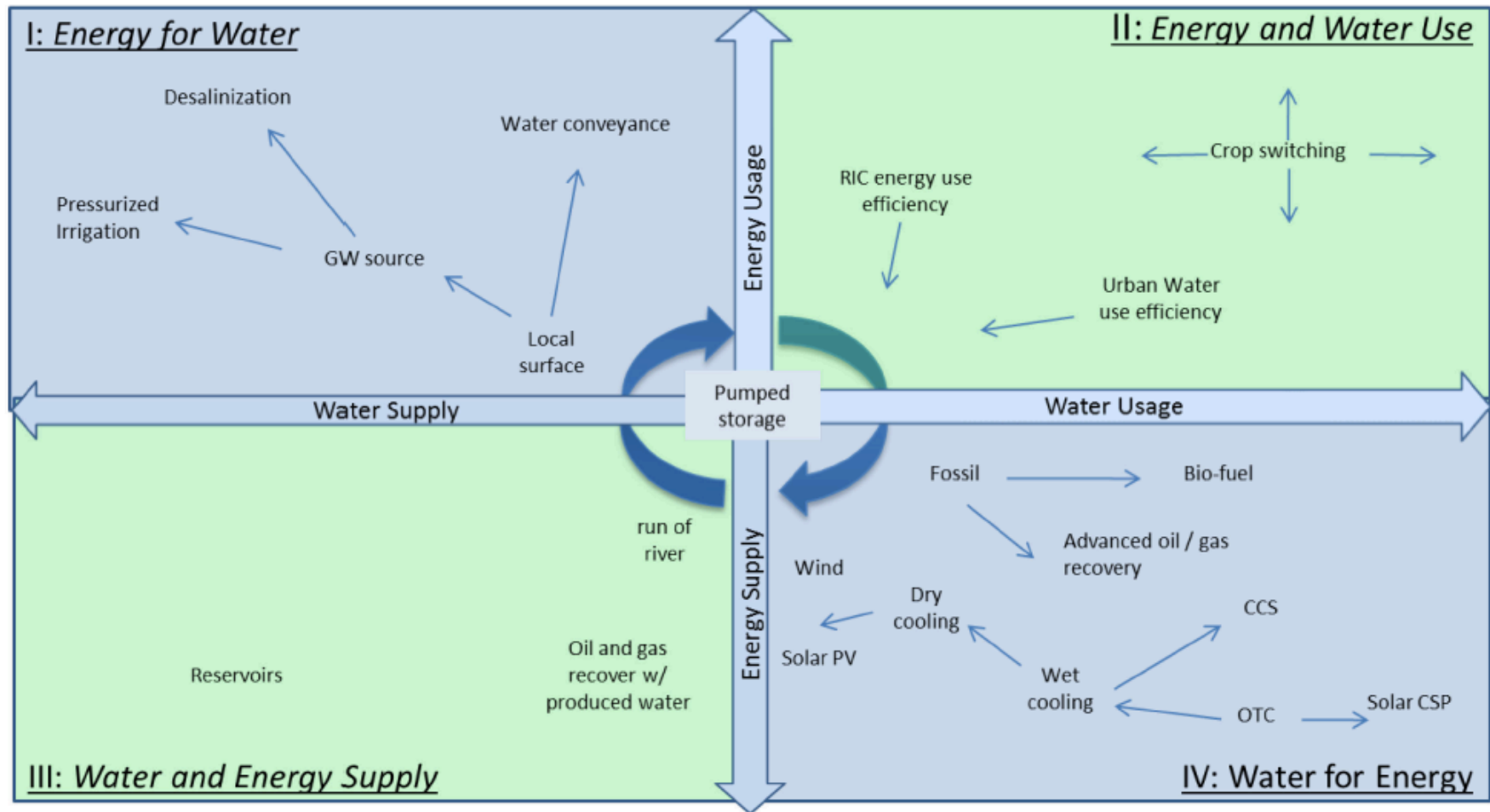
Wide jurisdiction in Energy...

... but less so in Water





The Nexus of Energy and Water



Source: CPUC Policy and Planning "Rethinking the Water Energy Nexus" (Jan 16, 2013)





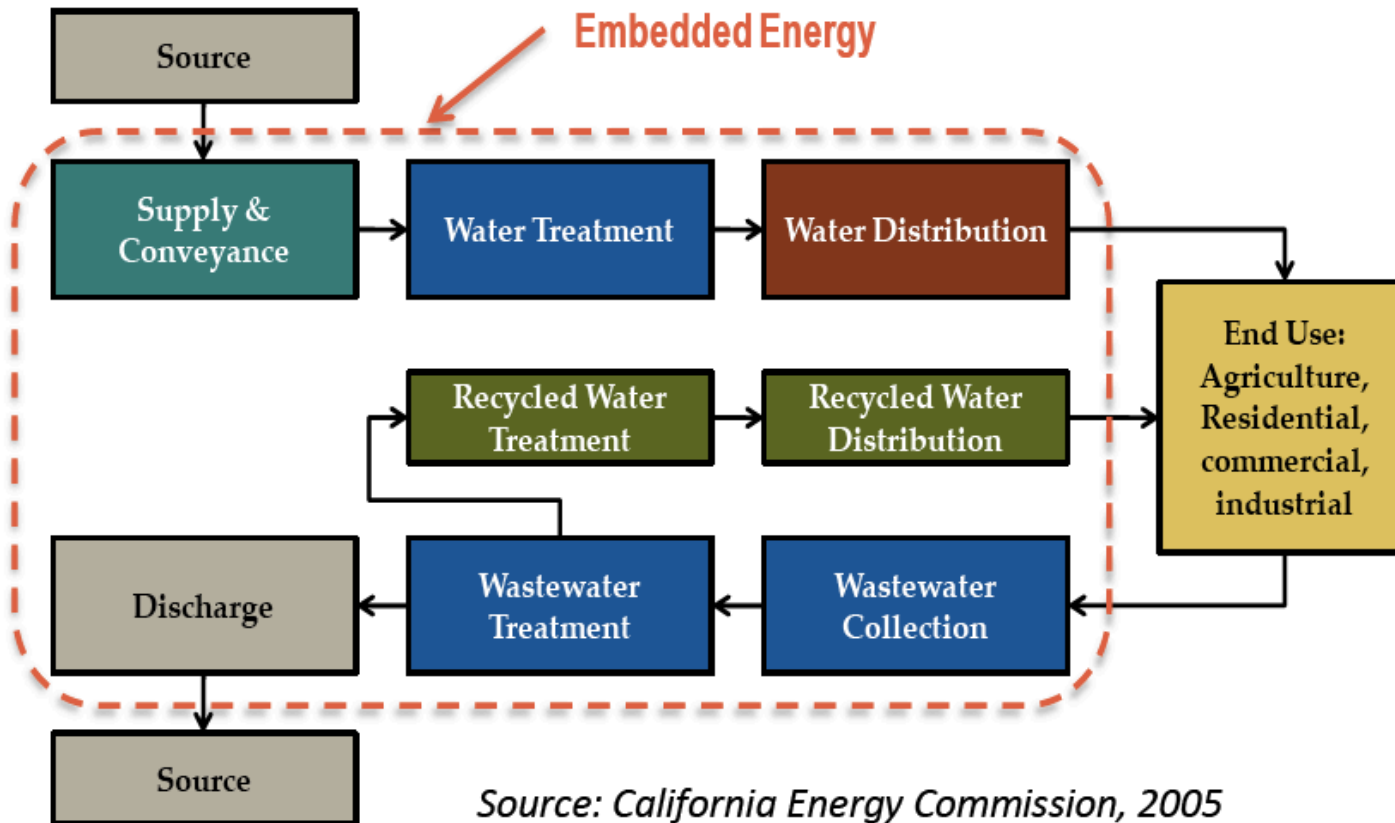
A Couple of Big Questions

- What is the potential for saving energy and reducing GHGs via the water sector in California?
 - Can energy embedded in water be relied upon as an energy efficiency resource?
- When water efficiency programs save energy and reduce GHGs, how do we account for these savings?
 - What is the value to California?
 - What is the value to energy and water ratepayers?
 - Who pays?





Defining the Embedded Energy in Water



Source: California Energy Commission, 2005

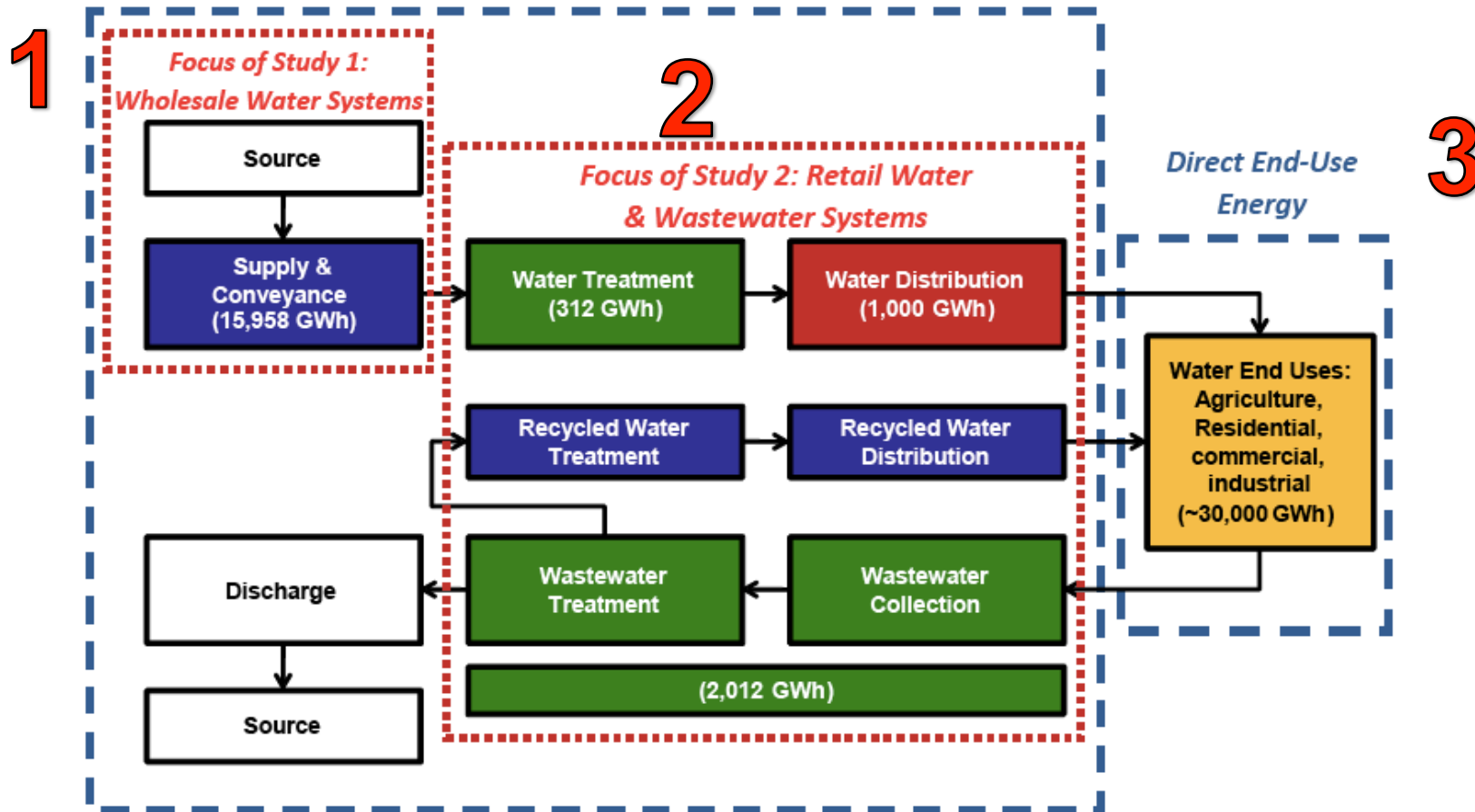
Embedded Energy is the amount of energy needed to collect, convey, treat, and distribute a unit of water to end users, and the amount of energy that is used to collect and transport used water for treatment prior to safe discharge





Three Studies of Embedded Energy

*"Embedded" Energy (Upstream & Downstream of End Use) =
Direct Energy Use by Water & Wastewater Agencies*



Total Embedded Energy in Water = Sum of Energy Upstream and Downstream of End Use

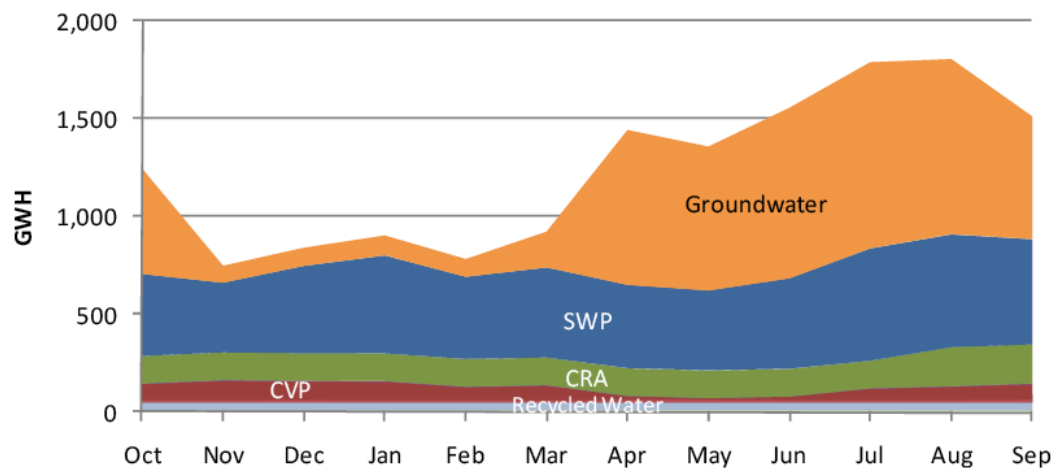




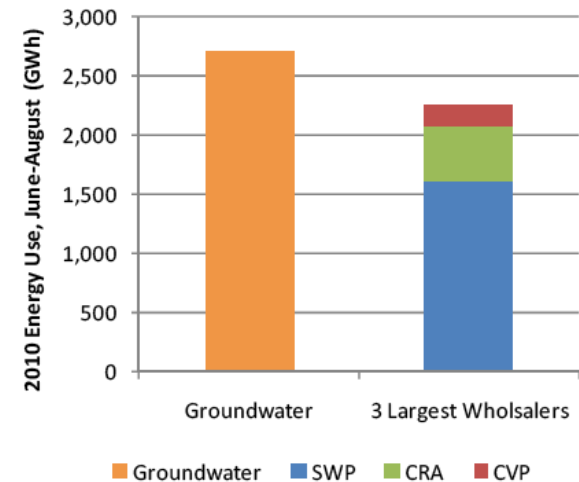
1: Wholesale Water Systems (5/31/10)

- Groundwater energy accounts for a significant portion of the additional energy in the Supply and Conveyance segment.
- The primary driver of electricity use is water demand in relation to the types and location of water resources used to meet that demand.
- The amount of energy previously attributed to the Supply and Conveyance segment of the water use cycle is likely understated.

Figure ES-1. Monthly Energy Consumption in 2010 by California Water Supplies



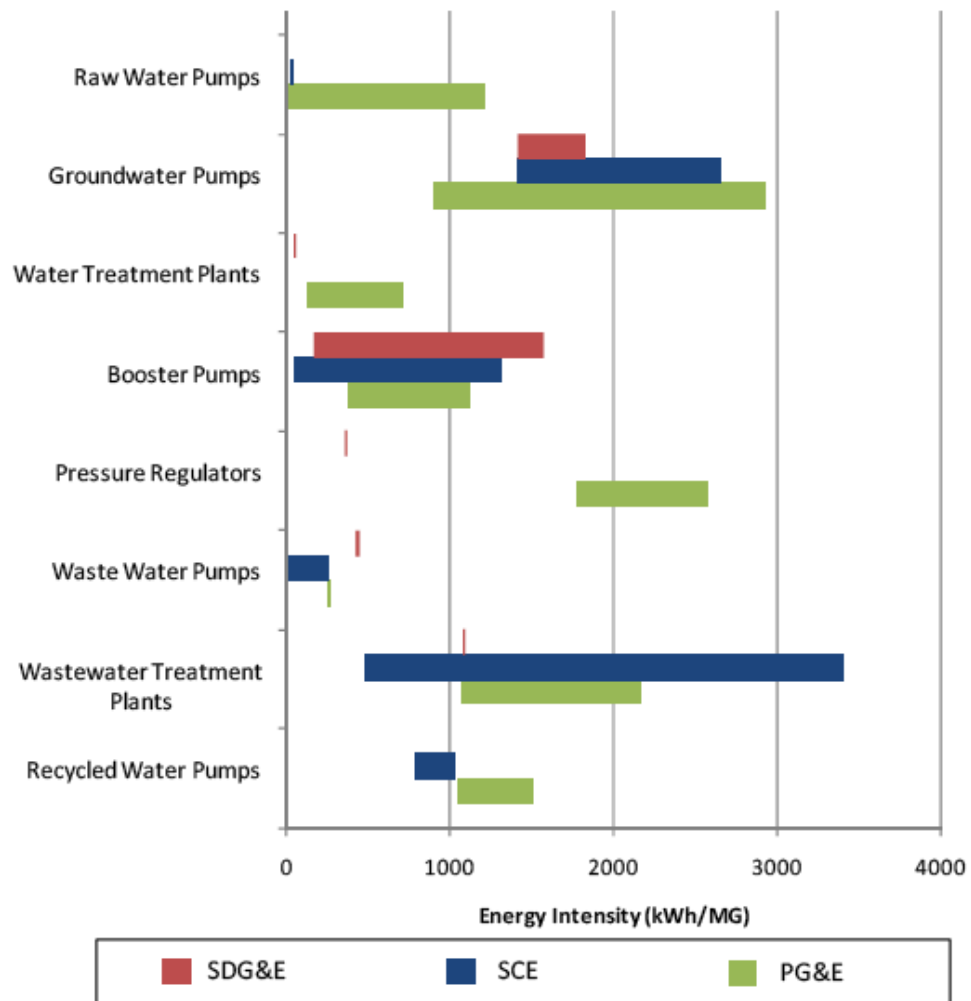
Summer Months (June-August) Comparison





2: Retail Water and Wastewater Systems (8/31/10)

1. There is considerable variation in the Energy Intensity of water depending upon activity and geographical location
2. The value of energy embedded in water is higher than that initially estimated by the CEC.

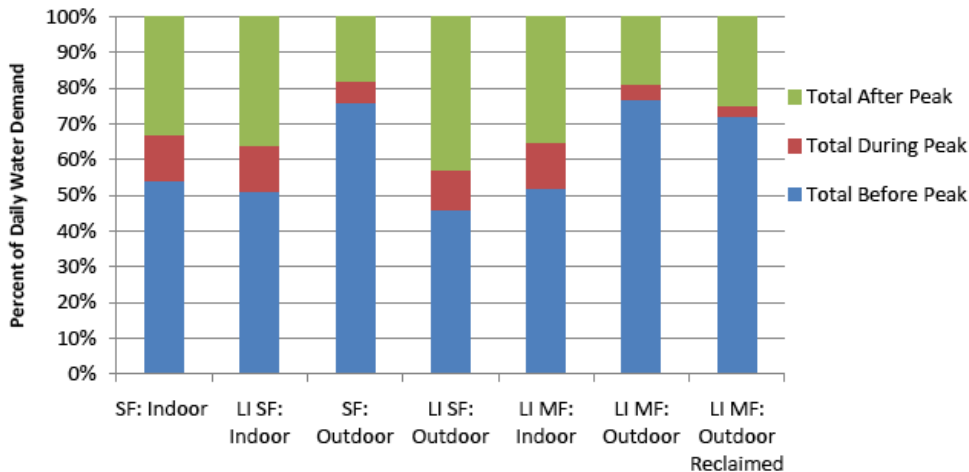




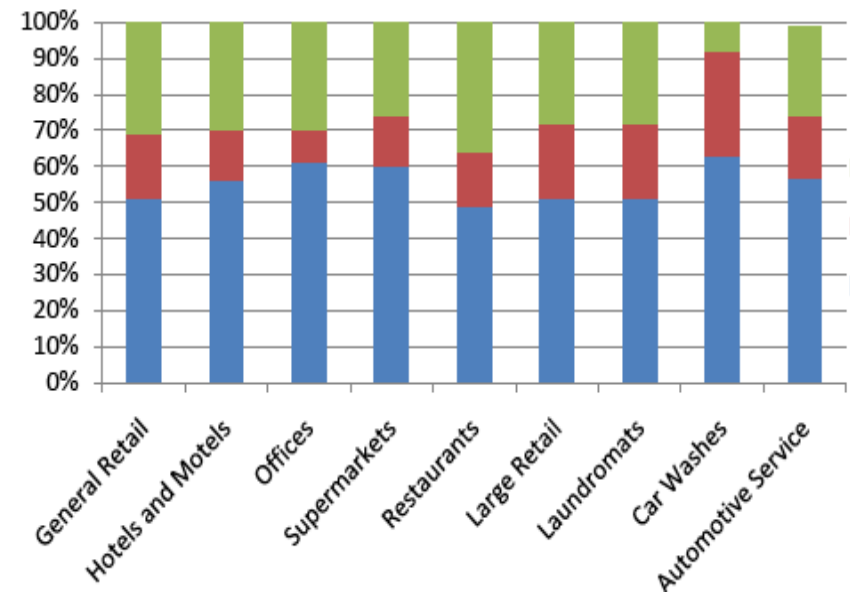
3: End-use Water Demand Profiles (4/29/11)

- No one type of end-user could be singled out as having a key relationship with peak energy demand. Embedded energy in water may not be a good target for peak reduction programs.

Residential



Commercial





The Current Demand-Side Portfolio aims to reduce Energy used for Water

- Water-Energy Pilot Projects (2007-2011)
 - Leak/loss detection and pressure management
 - Landscape irrigation efficiency, High efficiency toilets, Ozone laundry
- Energy Efficiency programs:
 - “Industrial” Custom projects for water agencies/utilities/districts
 - Local Government and Institutional Partnerships
 - Agricultural: pumping & irrigation efficiency
 - Encouraging Demand Response and Distributed Generation simultaneously with Energy Efficiency improvements
- Continuous Energy Improvement
 - create and implement strategic energy management plans at water agencies, using a “cohort” model

<http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Water-Energy+Nexus+Programs.htm>





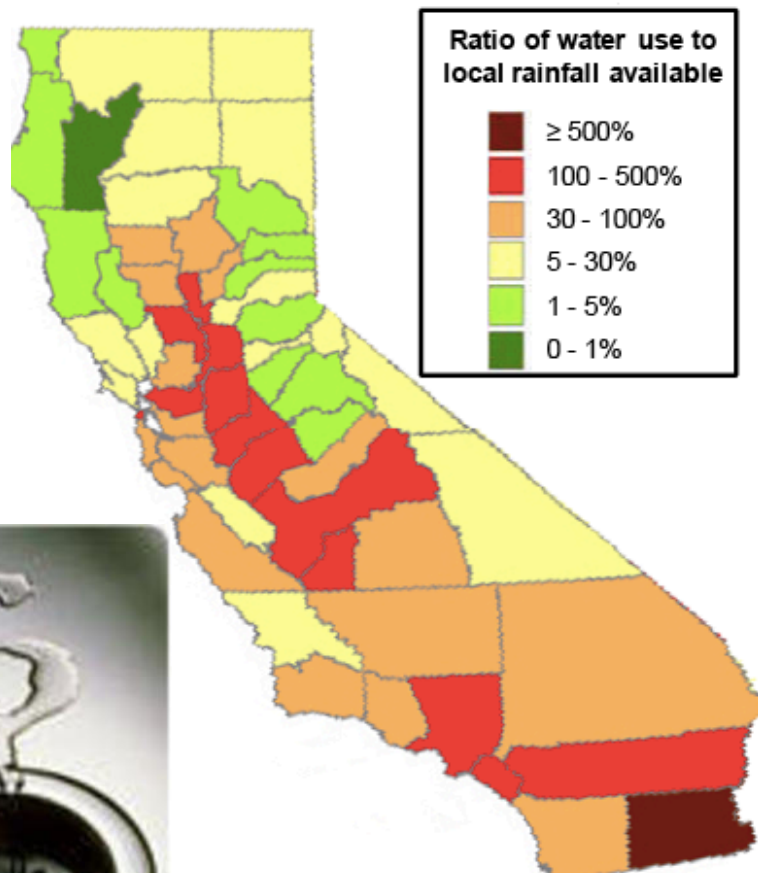
Water-Energy Efficiency Cost Effectiveness

- Programs for embedded energy cannot be fully analyzed using existing tools
- We need a method for analyzing cost effectiveness of programs/measures that simultaneously save energy & water
 - Quantify embedded energy in water to calculate potential energy savings
 - Allow the IOUs to evaluate partnership opportunities for energy saving programs with water agencies/utilities
 - Allocate cost-sharing according to the benefits accruing to the energy vs. water utility ratepayers.





Who Should Pay?



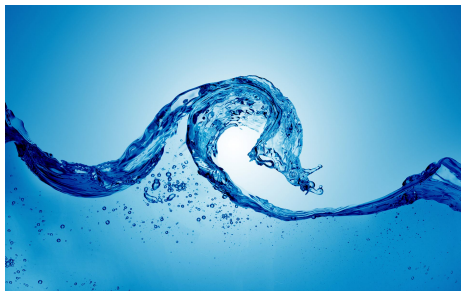
- Water Supply/Demand imbalances across IOU service territories
- Who should pay for system improvements if it avoids new power plants?
- Many smaller water utilities do not have large cash reserves to raise rates to cover efficiency programs





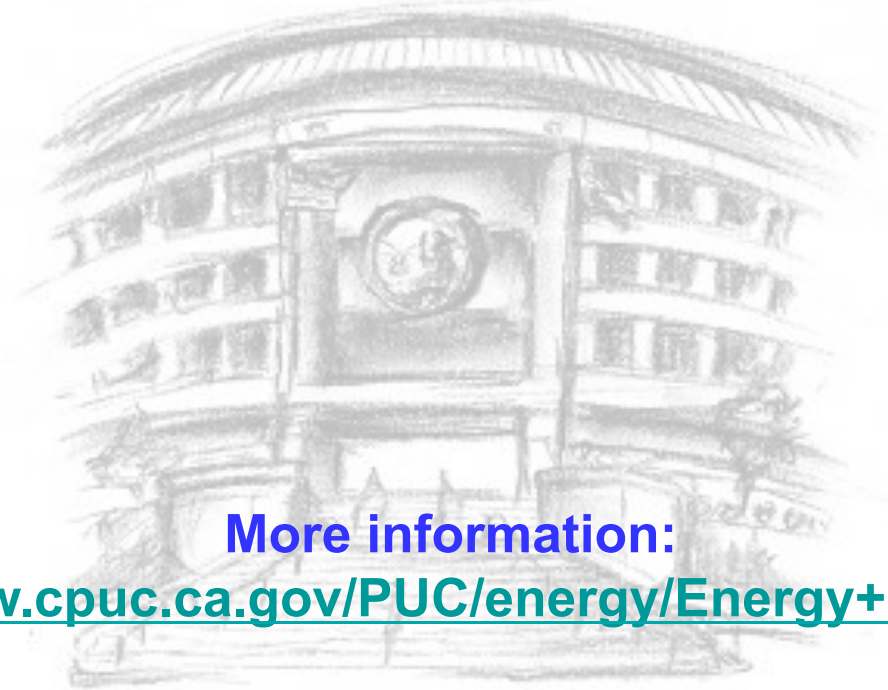
Rulemaking on “Policies to Promote a Partnership Framework”

- A new rulemaking will concentrate on two main tasks:
 - How to equitably provide for joint funding of water-energy nexus programs by the benefiting entities;
 - How to appropriately consider cost-effectiveness from a broader perspective by recognizing water, energy, and GHG reduction benefits
- Activities will include:
 - Identify methods for calculating energy savings and cost-effectiveness;
 - Identify issues with joint funding and implementation of water-energy programs by the IOUs and water entities,
 - Develop an updated water-energy cost-effectiveness calculator and methodologies for calculating the GHG emission reductions





Thank You



More information:

<http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/>

